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COMPARING HAPPINESS LEVELS OF TWO GROUPS OF COLLEGE STUDENTS:
MOUNTAIN CHALLENGE STUDENTS TO NON-MOUNTAIN CHALLENGE
STUDENTS

A Report of a Senior Study

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ABSTRACT

In America today, individuals are spending less time outdoors and destroying green spaces, and this has proven to correlate to a more depressed America than decades past. It has been shown that spending time outdoors in nature has a positive correlation to happiness and psychological well-being: A connectedness with nature leads to happier and healthier individuals, both physically and mentally. The purpose of this study was to examine two groups on the Maryville College campus, Mountain Challenge students (n=15) and Non-Mountain Challenge students (n=9), to determine if spending time outdoors has an impact on happiness levels of the two populations. The study consisted of 24 Maryville College students who all completed a brief survey about their sustainability actions and outdoor activity along with the Oxford Happiness Questionnaire. It was found that happiness levels of the groups did not vary, but the percent of time outdoor was significantly different. Limitations to the study include the small sample size, the time of year of the study, and the age range of the participants.

TABLE OF CONTENTS

	Page
Chapter I	
Introduction	1
Chapter II	
Literature Review	8
Chapter III	
Methods	24
Chapter IV	
Results	31
Chapter V	
Discussion	38
Works Cited	47

CHAPTER I

INTRODUCTION

Americans today are angrier and sadder than ever before: less than 20 percent of Americans are actually happy and thriving (“Anxiety Disorders,” 2016). In fact, 50 percent of Americans are anticipated to have a mental health disorder of some type, especially depression (Anxiety and Depression Association of America, 2016). In comparison, 25 percent of young adults in America are expected to develop depression, whereas 20 years ago that number was less than 10 percent (Selhub, Eva M., Logan, 2012). Anxiety is a disorder many people suffer from, which causes distress, uneasiness, and frightfulness for no reasons. Anxiety disorders, such as depression, obsessive-compulsive disorder, and post-traumatic stress disorder, are the most prevalent mental illnesses in the United States (Mental Health America, 2016). While over 40 million adults (18 percent of the population) in the United States suffer from at least one anxiety disorder, and many suffer from a combination of disorders, it is estimated that only one-third of those with some type of anxiety disorder actually seek treatment. The annual cost of treating anxiety disorders in the U.S. is a staggering \$42 billion (Anxiety and Depression Association of America, 2016). Depression can have a significant influence on a person’s outlook on life, attitude, and mood. The Americans way of life may

increase susceptibility to depression, as an ever growing number of people are diagnosed with depression each year. In contrast, people's connectedness with nature has decreased exponentially with the introduction of and the increase in technological use in everyday life.

A depressed society is a dangerous society for numerous reasons. Individuals with depression are much more likely to engage in substance abuse or binge drinking to try to cope with their depression. Physical health concerns, such as lack of sleep, loss of appetite, or no desire to exercise are also a major concern when dealing with depression. Physical harm, including cutting or burning, is another mode of coping with depression for individuals, which can lead to serious injuries or suicide. Suicide is a last resort option for some individuals with severe depression. In fact, two-thirds of suicides are in individuals suffering from depression (ULifeline, 2016). The prevalence of anxiety disorders and depression are thought to be more prevalent in today's society than during the 20th century because of changes in the environment we live in. For example, relationships with other individuals are weaker, people are more focused on money and image, and expectations are incredibly high (Twenge, 2014).

Our earliest ancestors depended upon the natural environment wholly for daily necessities. E.O. Wilson coined a term "biophilia" when he was describing the connection between humans and living things and affinity for life (Day, Theurer, Dykstra, & Doyle, 2012). More specifically, biophilia was defined by Wilson as "an innately emotional affiliation of human beings to other living organisms." In nature can be found the two absolutes humans cannot live without: oxygen and the sun. (Selhub & Logan, 2012). Humans have a connection with the natural environment that cannot be

duplicated. It is only recently (within the last century) that humans have become so disconnected from and deprived of nature due to the ever growing technological world (Selhub, Eva M., Logan, 2012). The National Recreation and Park Association reports only 12 percent of American adults spend time outdoors daily, while another eight percent of adults spend three-four days per week outside. In addition, only 31 percent of adults (ages 25-54) spend over an hour per day outdoors (Hoffman, 2014). In Americans, the lack of time outdoors may be linked to the recent decrease in the nations' IQ scores compared to the 20th century. In the 1980s through the early 2000s there was an incredible increase in IQ, which was identified by Dr. James Flynn, and called the Flynn Effect. However, since the early 2000's the mean IQ scores have been dropping. The increased use of technology in children and adults has been blamed for reversing the Flynn effect (Selhub, Eva M., Logan, 2012). The society of today is not only losing touch with nature but also physically losing nature by destroying natural habitats that have been around for thousands of years by expanding their own habitats through developments, deforestation/desertification, increased carbon footprint, and industrial expansion. Humans have built dams in over 30 percent of the world's rivers and have changed or covered over half of the land surface of the world (Conca, 2015).

From National Park data, it is clear that some Americans are still getting outside. The Great Smoky Mountains are the most visited National Park in the US, with 307 million visits in 2015. That number is staggering at first glance, but it is also important to take into consideration the number of people who visit multiple times per year and those who visit only by driving around Cades Cove Loop (National Geographic, 2016). From previous research, it is thought spending time in nature can reduce the effects and

prevalence of anxiety. Longer periods of time spent outside produces lower levels of stress and depression in individuals (Shanahan et al., 2016). From the study of over 300 participants, a vast majority reported signs of increased relaxation as well as a stress relief in response to spending time in nature (Martyn & Brymer, 2016). A dose of as little as 30 minutes outside at a time can provide a number of positive benefits like a positive impact on happiness, cognition and attention (Capaldi A., Dopko L., & Zelenski, 2014). Spending 30 minutes outdoors on a regular basis provides these benefits on a much larger scale (Shanahan et al., 2016). Being connected with nature has a clear positive impact upon anxiety and stress levels in individuals (Martyn & Brymer, 2016).

Being connected with nature has a positive impact upon health of the population, both physically and mentally. After participating in the “30 Days Wild” campaign, which involved people do something wild (engaging in nature) every day for a month to encourage and promote nature and connectedness with nature, people had increased levels of noticing, sharing, doing, or connecting (Richardson, Cormack, McRobert, & Underhill, 2016).

While natural environments are important, it is also interesting to consider natural environment factors in the workplace as having a positive impact on health and well-being. For example, offices with window views have impacts upon workers including higher satisfactory rates with the job, fewer complaints of sickness, less frustration, more patience, higher life satisfaction, and better health overall. In school-aged children, children having natural environments for play areas have less problems with concentration and attention than students with access to traditional playgrounds. In addition, children with Attention Deficit Disorder (ADD) showed less severe symptoms

after playing in green areas than after playing in environments that were not natural or were less natural (Day et al., 2012).

It is evident students who are actively engaged with environmental studies have a different perspective on nature and spend time outdoors. Nature relatedness was found to have a positive correlation with positive affect, vitality, autonomy, life meaning, and life satisfaction. These students were able to maintain lower levels of stress during the worst times of the semester and during worse weather compared to students who were not taking any environmental classes (E. K. Nisbet, Zelenski, & Murphy, 2011).

Disconnecting from nature has not only had a negative impact on the environment due to people caring less about it, but it also has a negative effect upon human happiness.

Evidence has been found linking access to green spaces to increased happiness, as well as decreased depression, mental distress, stress, and anxiety disorders (Shanahan et al., 2016, Capaldi A. et al., 2014). Contact with nature has also been found to be a predictor of human health and well-being, providing individuals with beneficial human affect, psychological well-being, stress recovery and fatigue recovery. One of the outcomes of living near nature may include improved physical health. In 2005, people in European cities with abundant greenspace had a 40% reduction in the risk of being obese or overweight and were three times as physically active (Thompson Coon et al., 2011).

When the positive benefits of nature are combined with the positive benefits of physical activity, the beneficial impact may be multiplicative. Panacea et al. examined the effects of physical activity occurring in nature and its influence upon emotional well-being and sleep quality. Their tests were done in green areas, blue (aquatic) areas, and white (snow-covered) areas over the course of winter and spring seasons and provided

additional support for green exercise having a positive effect on long-term mental health and well-being. On the emotional well-being side, it was found that higher frequency visits to green spaces correlated positively to better emotional standings (Pasanen, Tyrväinen, & Korpela, 2014). Outdoor exercise and well-being has been found to be more positively correlated than exercising indoors and well-being (Veloso & Loureiro, 2014). Individuals who exercise outdoors have reported higher levels of enjoyment, positive affect, having fun, and simply feeling good compared to indoor exercisers. Compared exercising indoors, outdoor exercise has an positive influence on motivation, exercise behavior, and intention to continue exercising. Overall, exercise in the natural world is better for individuals both on the enjoyment side of things but also on the psychological side of the spectrum (Calogiuri, Nordtug, & Weydahl, 2015). Plante, Cage, Clements, and Stover found that exercising outside provided more energy and was more enjoyable to individuals than exercising indoors (Plante, Cage, Clements, & Stover, 2006).

Mountain Challenge at Maryville College is a program designed to get students active outside. Recently, Mountain Challenge has begun a new campus initiative called Fit. Green. Happy. TM This initiative is designed to get the community more active, more environmentally aware and friendly, and happier as a result of combining the two (Guillaume, n.d.). Therefore, we want to examine the happiness levels of Maryville College Mountain Challenge students in comparison to students who are not involved with Mountain Challenge to determine if there are any differences in their happiness levels.

From this research, we are hoping to be able to answer the following questions.
Does spending time outdoors actually have an impact upon a person's happiness levels?
Is there a difference between Mountain Challenge students' happiness levels compared to Non-Mountain Challenge students?

The major limitation to this study is the small sample size. There are 15 Mountain Challenge students, so the total number of participants from the control group (n=9) and the experimental group is 24. Another factor that could contribute is the time of year in which the data is being collected. Data collection happened between the months of October and November, the times in which mid-term examinations are completed and the semester has taken a step back on the toughness scale.

CHAPTER II

LITERATURE REVIEW

Relationship between outdoor time and happiness

To extend upon previous research a recent study was conducted to evaluate the relationship between depression, anxiety and connectedness to nature by examining state and trait aspects in addition to cognitive and somatic aspects of anxiety in relation to nature connectedness (Martyn & Brymer, 2016). Before this study, the majority of the research conducted focused on state anxiety. In this study, the Nature Relatedness Scale (NRS) and the State Trait Inventory for Cognitive and Somatic Anxiety (STICSA) were used to measure connectedness to nature, anxiety, and state and trait anxiety. The NRS consisted of 21 items, which measured people's relation to the natural world in correlation with affection, cognition, and physical relationships. The STICSA measures anxiety as a whole, as well as somatic and cognitive aspects of state and trait anxiety. Participants were recruited from the Australian Psychological Society and an Australian University and ranged in age from 18 to 79 years with nearly 80% of the participants being female. From the study of over 300 participants, a vast majority of individuals who reported high levels of nature connectedness exhibited increased relaxation, as well as a stress relief in comparison to individuals who reported significantly lower levels of nature connectedness. Participants with high levels of nature connectedness used words such as

“peaceful” and “calming” to describe their feelings about their time in nature and described that nature “provided a sense of renewal, was re-grounding, and created feelings of fulfillment.” Being connected with nature had a clear positive impact upon anxiety levels. These findings support the Attention Restoration Theory, the Biophilia Hypothesis, and the Psycho-Evolutionary Theory. With this study, there were a few limitations, which included the participants themselves. The participants were self-selected, so only the people highly interested in nature may have participated in the study. Researchers recommended future research should investigate the differences between somatic and cognitive anxiety in connection with nature relationships (Martyn & Brymer, 2016).

Capaldi, Dopko, and Zelenski conducted a meta-analysis using results from 21 studies of 8523 participants to more closely examine the relationship between connectedness with nature and happiness (Capaldi A. et al., 2014). Of the 21 studies, ages of participants ranged from 18 years to 74 years and the amount of females in the studies ranged from 38 percent to 86 percent. Inclusion in the analysis required at least one measure of happiness, one measure of connectedness with nature, and some type of report regarding the correlations between happiness and nature connectedness. While there could potentially be different definitions for happiness depending on the person, this study focused on three specific qualities: positive affect, life satisfaction, and vitality. Nature connectedness measurement was also narrowed down to three specific areas: The Connectedness to Nature Scale (CNS), the Nature Relatedness Scale (NRS), and the Inclusion of Nature in Self Scale (INSS). The purpose of the study was to link nature connectedness to happiness levels in individuals. It was concluded there is a clear and

positive relationship between being connected with nature and leading a happy life. The reports of vitality of the participants showed the strongest difference when connected to nature due to the restorative impact nature has. Positive affect and life satisfaction were the two next major measures positively influenced by individuals' time spent in nature. Spending time in nature and natural environments not only has a positive impact on happiness but also decreases cognitive fatigue and increases attention levels. Overall, the individuals who were spending the most time outside were showing signs of lower mental fatigue. Limitations to the study are mainly related to the numerous inclusion requirements for analysis (Capaldi A. et al., 2014).

In a study done on outdoor exercise, well-being, and connectedness to nature, researchers aimed to examine the relationship between exercising outdoors to well-being (Veloso & Loureiro, 2014). More specifically, researchers designed the study to determine whether natural environments and having a connection to these natural environments had a positive influence upon well-being in physically active adults. The participants, consisting of 282 adults in Portugal ranging in age from 18 to 74, completed the Connectedness to Nature Scale (CNS), the Positive and Negative Affect Schedule (PANAS) to measure positive and negative moods, and the Subjective Exercise Experiences Scale (SEES) to measure psychological responses to exercise. Also included in the surveys were questions regarding physical activity indoors and outdoors. Of the total participants, 159 people (77 males and 82 females) exercised indoors and outdoors and 123 people (82 males and 41 females) exercised indoors only. Outdoor exercise and well-being were found to be positively correlated as opposed to individuals who exercised indoors. Contact with nature was found to be a significant predictor of human

health and well-being, providing individuals with beneficial human affect, psychological well-being, stress recovery and fatigue recovery. Human health was significantly increased with the group who exercised outside because those individuals wanted to be outside and active while outside much more frequently. Compared to the group who exercised indoors only, the group who exercised both indoors and outdoors had higher levels of well-being and positive affect. Individuals who exercised outdoors also reported decreased levels of distress. In future research, it would be beneficial to examine differences in individuals who exercise solely outdoors to individuals who exercise only indoors to examine any differences in well-being. The combination of indoor and outdoor exercise can be implemented into exercise programs to promote well-being and physical activity to clients (Veloso & Loureiro, 2014).

Individuals who exercise in the outdoors have reported higher levels of enjoyment, positive affect, having fun, and simply feeling good compared to their indoor exercise (Calogiuri et al., 2015). Exercising in the natural environment has a positive influence on motivation, exercise behavior, intention to continue exercising in the future, and improved exercise habits compared to those who exercised indoors. Overall, exercise in the natural world is better for individuals both on the enjoyment side of things but also on the psychological side of the spectrum (Calogiuri et al., 2015).

In their article referring to the psychological benefits of indoor and outdoor exercise, Plante, Cage, Clements, and Stover took a group of 112 psychology students (47 male and 65 female) and exposed them to a variety of exercise conditions. The participants then completed a variety of self-report measures, including the Activation-Deactivation Adjective Check List (AD-ACL), the Paces Activity Enjoyment Scale (PACES), and the

Marlowe Crowne Social Desirability Scale to reflect upon mood states, enjoyment, and desirability (Plante et al., 2006). The participants were assigned to one of three conditions: outdoor walk, virtual reality walk, or virtual reality with no exercise. The first condition had the participants walk around campus at a brisk pace for 20 minutes. The second condition had the participants walk on a treadmill with a virtual reality video of the exact same route for the same time period. The third consisted of the participants watching the virtual reality video of the route for 20 minutes while sitting in a chair. Participants completed the AD-ACL and PACES questionnaires after completing one of the three conditions prescribed. The study found exercising outdoors provided the participants with more energy than either the treadmill walks or sitting down while watching the virtual reality video. In addition, participants who walked around campus reported being less tired than those who walked on the treadmill or who sat down for the entire experiment period. Exercising outdoors was found to be the most enjoyable by participants compared to exercising indoors with virtual reality videos. From the study, it was suggested that exercise in nature provides a different benefit than does exercising indoors. It is interesting to consider the differences being outdoors has upon the body and the psychological aspects of physical activity, such as enjoyment, mood, tiredness, calmness, and energy. Limitations to this study consist of each individual only participating in one of the three different experimental conditions. In future studies, more conditions should be used to determine more specifically the influence being outdoors has on an individual by having all of the participants included in each condition instead of only one condition (Plante et al., 2006).

Humans have a connection with the natural environment that cannot be duplicated. It is only recently (within the last century) that humans have become so disconnected from nature. Disconnecting from nature not only has a negative impact on the environment due to people caring less and less about it, but it also has a negative effect upon human happiness. Being connected with nature has a positive impact upon the physical and mental health of the population. To encourage and promote nature and connectedness with nature, a group of researchers created an online campaign called “30 Days Wild” to have people do something wild (engaging in nature) every day for the entire month of June in 2015 (Richardson et al., 2016). The study encouraged participants to come up with their own ideas for ways to engage in nature. People had various levels of immersion and participated in four different types of activity: noticing, sharing, doing, or connecting. Noticing consisted of activities such as stopping to smell a flower or to watch a bird fly from tree to tree. Sharing consisted of posting pictures and text about nature on social media to spread the knowledge of the campaign. Doing allowed the participants to directly or indirectly influence nature by allowing flowers to grow unharmed or eliminating the use of pesticides in familial gardens. Connecting allowed participants to connect with nature in ways they had not considered previously, such as eating wild plants or making art from natural materials. Initially 12,400 people across the United Kingdom signed up to participate in the “30-Days Wild” experiment; however, only 2,305 people completed the initial survey, 344 completed the initial and final survey, 269 completed the initial survey and follow-up survey two months later, and only 126 participants completed all three; the initial survey, final survey, and the follow-up survey. The surveys measured well-being, nature connectedness, nature behaviors, and health. Of

the 126 participants who completed all three surveys, ages ranged from 22 to 71, and participants were primarily female (88%). Compared to the initial surveys, the final surveys showed significant improvements in health, happiness, nature behaviors, and nature connectedness. These increases were maintained through the follow-up survey which was administered over two months after the experiment ended. Impressively, from the time the experiment ended to the follow-up survey, participants had increases in all four categories, even though there was no experiment suggesting they engage in nature. It is important in this study to note the study was not focused on promoting any of the four studied areas. Instead, it was more focused on adding more evidence to show nature and nature connectedness makes life better. One limitation to the study comes in the relatively small sample size. Another limitation to the happiness and well-being scales is the time frame (June/Summer) the study was done in. Typically, people tend to be happier during the summer months and that happiness does not typically decline until late into the fall and winter. This study was non-randomized, completed entirely online, and relied on self-report, therefore, there is no way to accurately know if the data presented was actually correct and brings to question the representativeness of the result. Further data collection is necessary to determine whether gender influences nature relatedness since this study mainly consisted of female participation (Richardson et al., 2016).

It is evident students who are actively engaged with environmental studies have a different perspective on nature and spending time outdoors compared to students who are not actively engaged (E. K. Nisbet et al., 2011). In their paper Nisbet et al. describe the results of three similar studies but conducted on different populations. The purpose of the first two studies was to determine whether or not nature relatedness had any influence on

well-being. In the first study, 184 Canadian undergraduates were recruited, ranging in age from 17 to 22, 124 being female and 60 being male. The study used the Nature Relatedness Scale (NRS) to assess experiences, cognitions, and affect with nature. Multiple different measures were used to measure different aspects of well-being: The Psychological Well-Being Inventory (PWB) measured different dimensions of well-being, the Positive and Negative Affect Schedule (PANAS) measured high-arousal pleasant and unpleasant affect, and the Satisfaction with Life Scale (SLS) was used to measure participant's satisfaction with life. Environmental related measures included the New Ecological Paradigm Scale (NEPS) to measure ecological worldview, the New Ecological Conscious Scale (ECS) to determine feelings toward the degradation of the environment, and the Ecology Scale (ES) to determine willingness to change to benefit nature. From study one, researchers found a positive relationship between nature relatedness and well-being in the participants. The researchers then replicated this study on 145 executive government positions within Canada (87 males, 56 females, and 2 non-identifying) who ranged in age from 33 to 51 years. The second study was done to eliminate any possible differences in perspective on life from different age groups. From this study, nature relatedness was found to have a positive correlation with positive affect, vitality, autonomy, life meaning, and life satisfaction. Also, individuals who were more strongly related to nature had a higher level of personal growth throughout life. (E. K. Nisbet et al., 2011). The third study in this experiment involved using students who were taking environmental classes and comparing those results to students who were not taking any environmental courses in a longitudinal study conducted over the course of a fall semester. 170 Canadian undergraduate students (ages 17 to 22) were included in this

particular section of the study. Nature relatedness and well-being of the students were measured. This study showed the students who were in the environmental classes were able to maintain lower levels of stress during the worst times of the semester and during worse weather compared to those students who were not taking any environmental classes. Students who were involved in environmental classes had more passion about nature and this could be attributed to their constant contact with nature. Limitations to the collection of these studies include the inability to randomly assign students to environmental courses and the time of year the study was conducted (late fall through winter). More research is needed to determine any links between nature relatedness and pleasing emotions. (E. K. Nisbet et al., 2011).

Mechanisms explaining the benefits of nature

In examining the impacts of nature on mental health and well-being, it is critical to look at the ways in which this actually occurs. There are environmental conditions, physiological and psychological states, behaviors and conditions that can impact the health and happiness of an individual (Kuo, 2015). Environmental conditions include chemical and biological agents such as phytoncides given off by plants, negative air ions, and mycobacterium vaccae and environmental biodiversity which have been shown to reduce blood pressure and depression, boost immune functioning. Environmental conditions can also impact physiological systems, and may reduce sympathetic nervous system activity, increase parasympathetic nervous system activity and restore attention. Blood tests provide insight into how natural environments influence physiological and psychological characteristics. Didehydroepiandrosterone (DHEA), which influences the

cardiorespiratory system, obesity, and diabetes, and adiponectin, which prevents atherosclerosis, have been found to be at higher levels in the blood after a forest walk but not after a walk in urban areas. Being in nature for extended periods of time has been found to decrease the chances of health risks, including high blood pressure and inflammatory cytokines. These are a short list of the many different ways being in nature positively influences the health of individuals (Kuo, 2015).

Elizabeth Nisbet and Melissa Lem, two well-known psychologists, examined the influence being outdoors and in nature has on human health, and found that interacting with nature resulted in positive health benefits, both physically and psychologically (E. Nisbet & Lem, 2015). Evidence from a plethora of research studies supports the idea of green spaces being good for human health in numerous ways, including improving heart health, reducing respiratory illnesses, and depression. Greater immersion in nature has been linked to a multitude of positive health outcomes such as optimal cortisol levels, anti-cancer protein levels, natural killer-cell activity, and variability of heart rate. Depression symptoms have been greatly reduced after a walk through a natural environment when compared to an urban environment. Cognition (problem solving, concentration, and cohesive social interactions) was also improved by being in the natural world. Because of the positive relationship between spending greater time outdoors and greater health and happiness, 'nature prescriptions' are becoming more and more common across the globe. Spending time in nature is a natural remedy and can greatly decrease medication use. Access to nature is oftentimes free and easy to access, so more research needs to support nature as a prescription for patients struggling with a plethora of different illnesses (E. Nisbet & Lem, 2015).

Theories about the importance of nature to mankind

Our earliest ancestors depended upon the natural environment wholly for daily necessities. E.O. Wilson coined a term “biophilia” when he was describing the connection between humans and living things and affinity for life (Day et al., 2012). More specifically, biophilia was defined by Wilson as “an innately emotional affiliation of human beings to other living organisms.” He saw the connection with nature as a phenomenon embodied by numerous cultures who strive for the presence of trees, fresh water, plants and animals, and predatorily favorable views. In nature can be found the two absolutes humans cannot live without: oxygen and the sun. Oxygen is the single unit stemming all life on earth, while the sun is responsible for providing Vitamin D required in humans and providing energy plants need for life. Wilson’s definition of biophilia supports the idea of self-preservation. Humans are naturally drawn to sources of food, water and shelter, and are born with an instinctive fear of harmful/poisonous animals. (Selhub & Logan, 2012).

While natural environments are important, it is also interesting to consider natural environment factors in the workplace as having a positive impact on health and well-being. For example, workers with offices that have window views experience positive impacts such as higher satisfactory rates with the job and life, fewer complaints of sickness, less frustration, more patience, and better health overall. In children having natural environments for play area has less problems with concentration and attention compared to those having less-natural playgrounds. In addition, children with ADD showed less severe symptoms after playing in green areas than after playing in environments that were not natural or were less natural (Day et al., 2012).

In addition to the biophilia hypothesis is the Attention Restoration Theory (ART), coined by Kaplan in response to directed attention fatigue. There are two types of attention: voluntary and involuntary. Voluntary attention happens with effort from the mind and body, while involuntary attention does not require any effort. The constant drive of today's society for people to engage in extended periods of voluntary attention, whether at work, at school, or at home, causes severe mental fatigue (Selhub, Eva M., Logan, 2012). In urban societies, which are becoming the commonality in today's society, individuals are required to constantly be aware of their surroundings and are constantly being stimulated, which over time can cause cognitive fatigue. Natural environments have the ability to reverse the effects of this constant stimulation (Pearson & Craig, 2014). The ART is a theory stating "nature itself might provide cognitive restoration via its ability to take the load off all the inhibitory effort required in our modern world." Natural environments have the ability to allow for high levels of involuntary attention without absorbing the increased levels of energy required during voluntary attention, thus decreasing the amount of cognitive fatigue. Four main components of ART, being away, fascination, extent, and compatibility, combine to provide restoration from mental fatigue. Being away can include removing oneself from the source of mental fatigue, simply closing the eyes to visualize natural environments, or taking a few minutes to look out the window at a natural environment. Fascination refers more specifically to soft fascination, such as watching a sunrise, as opposed to hard fascination, such as watching a sporting event. While both of these fascinations have involuntary attentional benefits, the sunrise seems to be the more beneficial of the two. Extent refers to the nature depth allotted. A single tree is considered nature, but being in

an orchard of a multitude of trees is much more beneficial to mental fatigue.

Compatibility simply means being compatible and fulfilled while in nature. If the human race can fulfill these four criteria regularly by spending more time in nature, it may be possible to diminish the impacts of cognitive fatigue faced in today's society (Selhub & Logan, 2012).

Means of increasing mental health by using nature

Nature has been found to improve mood and self-esteem and decrease anger, depression, and tension, while also providing psychological health benefits and providing a means for social connectivity. Ecotherapy is defined as a natural, free, and accessible treatment method to improve mental health and well-being. Types of ecotherapy include horticulture, forest bathing, or just simply going outside regularly for a walk. Researchers from the University of Essex, in collaboration with Mind, examined the influence of ecotherapy on well-being. The purpose of their study was to provide further support for green exercise as therapy that supports the improvement of mental health and well-being through green exercise and to promote ecotherapy as a more widely used means of treating patients instead of relying solely on drugs and medications. Mind researchers examined the impact of green exercise activities, which included gardening, conservation and walking in 108 participants (78 male) ranging in age from 31 to 70. These activities lasted anywhere from 15 minutes to six hours, with the most common time period being two hours. The research consisted of reflections by the participants on their expectations before participating in nature-related activities and comparisons to those expectations once they had regularly been engaging in the activities. 88% of respondents reported that

being connected with nature was very important to determining their feelings. 94% of participants reported being more motivated, more positive, and feeling healthier mentally upon spending extensive amounts of time in nature. These findings support the idea behind ecotherapy being used as a source of therapy to promote positive mental health outlook. In addition to the initial study, researchers also conducted a study on outdoor versus indoor exercise (walking) to examine any differences on self-esteem, mood, and enjoyment in the two environments. The walks were the same intensity and duration to make sure those characteristics did not influence the results, and participants were given a survey to complete immediately before and after the walk. To measure self-esteem, the Rosenberg Self-Esteem Scale (RSES) was used. The Profile of Mood State questionnaire (POMS) was used to measure mood change, and the Total Mood Disturbance (TMD) was calculated to determine emotional state. After completion of the nature walk, 90% of participants experienced improved self-esteem, 71% reported decreases in feelings of depression, 71% had decreased feelings of tension, 71% reported feeling less tired, and 88% of people saw an overall improvement in mood. In comparison, 83% of respondents reported decreased mood, 45% of people felt more depressed, 50% of people had increased tension, and 50% of people had increased fatigue after the indoor walk. All of the data from this research supports the idea of ecotherapy as a means of increasing mental health and an adjunct therapy for patients experiencing depression or other types of mental distress (Peacock, Hine, & Pretty, 2007).

Shinrin-yoku, or forest bathing, is another method of using nature to provide therapeutic results. The art of shinrin-yoku has been incorporated into a healthy Japanese lifestyle since 1982 when it was introduced by the Forest Agency of Japan. It is now

gaining popularity in other areas of the world. Forests provide an area of amazing scenery, quiet, and clean air. Shinrin-yoku is simply a trip to the forest in which an individual sits and takes in the natural environment. One of the major reasons this is so beneficial is due to the phytoncides found in nature. Phytoncides are organic compounds released from trees, which provide positive health benefits for humans. Shinrin-yoku provides increased levels of natural killer cells in participants, which can positively impact the body for over 30 days in comparison to trips to the city, which have no influence on increasing the natural killer levels. The effects of natural killers on the body include decreasing generation and development of cancer, so increasing their levels by shinrin-yoku has the potential to decrease an individual's risk of cancer. When examining stress hormones, there is a significant decrease in their levels following a forest bathing trip, while city trips did not influence stress hormone levels at all (Li, 2010).

In addition, a study was done on 24 areas of Japanese forests during 2005 and 2006 on a total of 288 male students (12 per study) ranging in age from 19 to 24. Cortisol concentration was examined through saliva and the Profile of Mood States (POMS) was used to measure psychological response in the subjects. They were divided into two groups consisting of 6 each in each of the 24 areas. Half of the test group was sent to a forest and the other half was sent to a city on day one, then the sites of each group were switched on day two. While at the locations, participants sat and viewed the area for an average of 14 minutes and walked around for an average of 16 minutes. The results showed a decrease in the cortisol levels, pulse rates, blood pressure, sympathetic nervous system activity, and increased parasympathetic nervous system activity after the forest setting compared to the city setting, and provides additional support for ecotherapy as an

easy to use health enhancing behavior that could be prescribed (Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010).

CHAPTER III

METHODS

Participants

The study consisted of a control group and an experimentation group, which were both derived of Maryville College students. The age of the participants ranged from 18 to 23 years of age. The experimentation group consisted of 15 students of Maryville College, which are employees for the Mountain Challenge program. The Mountain Challenge students were recruited by their boss and founder of Mountain Challenge, Bruce Guillaume. The control group consisted of 9 other Maryville College students who were not part of Mountain Challenge and were not an Outdoor Recreation, Physical Education, or Exercise Science major. These students were recruited randomly by the individuals conducting the study. The experimental group participated in the study during the last two weeks of October, 2016 while the control group's data collection occurred in the first two weeks of November, 2016. All of the surveys were taken online in the Cooper Athletic Center located on Maryville College's campus with at least one experimenter present. The survey took the participants less than 20 minutes to complete. The only exclusion criteria for the study was the reported major of the control group; any major was allowed to participate except for Outdoor Recreation, Physical Education, or Exercise Science. This was because we anticipated that the individuals in these three

majors would tend to be more physically active and spend more time outdoors, which tends to be associated with greater life satisfaction.

Instrumentation

All participants completed the Oxford Happiness Questionnaire (OHQ). The OHQ was derived from the Oxford Happiness Inventory, which was designed in the 1980s at the University of Oxford to help with diagnosing manic and depression in individuals. The OHQ is a survey consisting of 29 questions about different areas of happiness (Table 1). The questions are ranked on a Likert scale from 1 to 6 with 1 being “strongly disagree” and 6 being “strongly agree.” The validity of the OHQ was studied at Oxford Brookes University using 172 undergraduate students (ages 13 to 68). The OHQ was found to have a validity of $\alpha = 0.91$, which is a high validity showing the OHQ is quite accurate and has a strong credibility (Hills & Argyle, 2002). Another study conducted in Kashan, Iran, on the happiness and spiritual well-being of individuals examined the validity of the OHQ as well. In this study, 384 individuals of two groups were studied to determine their happiness levels in comparison to one another. This study reported a validity of the OHQ of $\alpha = 0.87$. This shows the reliability of the OHQ and the internal consistency as well (Adib-hajbaghery & Faraji, 2015). With the validity being reported so high in the two studies above, we were confident that the OHQ would be a good source of collecting happiness data for this particular study. There are also 9 questions scattered throughout which are directed more towards the sad or unhappy side of the spectrum. These questions are required to be reversed in order to have the proper scoring. This prevents the individual taking the survey from putting the same number

down for every question, sometimes known as survey fatigue. The 9 questions below in the survey which are followed by an (R) are the reverse questions. This means that the individual would rate it with a lower number than the other questions. Take for example numbers 9 and 10. On number 9, a happy individual would rate that question with a 5 or 6, meaning moderately agree or strongly agree, respectively. On number 10, a happy individual would rate that question with a lower number of 1 or 2, meaning strongly disagree or moderately disagree, respectively. However, the individuals taking the survey were not made aware of the meaning of the (R) following the questions. They were simply told to take the survey and answer the questions to the best of their knowledge without spending too much time contemplating their answer for any particular question. Upon the completion of the survey, experimenters went through and reversed all of the questions ending with (R). For example, if a respondent answered question 1 with a “2” the experimenter would reverse that “2” to a “5”. The answers for all 29 questions were then added together and averaged to get the final happiness score for each individual. The scores of the OHQ were broken down into three categories: a score below 3 showed the individual was unhappy, a score between 3 and 4 showed the individual was neither unhappy or happy, and a score above 4 showed the individual was happy.

Table 1. The Oxford Happiness Questionnaire

Oxford Happiness Questionnaire
1. I don't feel particularly pleased with the way I am. (R)
2. I am intensely interested in other people.
3. I feel that life is very rewarding.
4. I have very warm feelings towards almost everyone.
5. I rarely wake up feeling rested. (R)
6. I am not particularly optimistic about the future. (R)
7. I find most things amusing.
8. I am always committed and involved
9. Life is good.
10. I do not think that the world is a good place. (R)
11. I laugh a lot.
12. I am well satisfied about everything in my life.
13. I don't think I look attractive. (R)
14. There is a gap between what I would like to do and what I have done. (R)
15. I am very happy.
16. I find beauty in some things.
17. I always have a cheerful effect on others.
18. I can fit in (find time for) everything I want to.
19. I feel that I am not especially in control of my life. (R)
20. I feel able to take anything on.
21. I feel fully mentally alert.
22. I often experience joy and elation.
23. I don't find it easy to make decisions. (R)
24. I don't have a particular sense of meaning and purpose in my life. (R)
25. I feel I have a great deal of energy.
26. I usually have a good influence on events.
27. I don't have fun with other people. (R)
28. I don't feel particularly healthy. (R)
29. I don't have particularly happy memories of the past. (R)

Procedure

The participants received and signed an informed consent before participating in the study. The Mountain Challenge students were recruited by their program and boss, Bruce Guillaume, and then all volunteered to participate, while the other Maryville College students were asked at random to participate by the experimenters. The OHQ was administered online through Survey Monkey by experimenters to help with the Fit. Green. Happy. TM slogan and eliminate paper waste, and all of the participants took the survey in the presence of an experimenter. This was done because the online formatting could have potentially been confusing for those taking it, so the experimenter was present to answer any questions should they arise. Before the study was administered, the participants all had an initial visit in Cooper Athletic Center with an experimenter to gather height, weight, and major to assure the individuals were able to participate in the survey. To avoid making assumptions that Mountain Challenge students spend more time outside, participants were asked a series of questions to support this idea. These questions included: “My intentional, on-going physical activity program includes (list all activities you currently regularly engage to be physically active, denote indoor activities with (IN) and outdoor activities with (OUT)).” “My intentional, on-going environmental sustainability actions include (list all activities you currently regularly engage to be environmentally friendly)” and “During the last 7 days, how much time did you spend sitting (on a weekday and a weekend day)?” The questions about sitting may be useful because most sitting activities occur inside instead of outside, so outdoor time was also inferred from this question. Additionally, all participants were asked to rate their general health status as: Excellent, Very Good, Good, Fair, or Poor.

There were numerous variables which were collected during the study. The independent variables consisted of the demographics information and other participant descriptive data collected before the study began. These are the height and weight of the individuals, which allowed the Body Mass Index (BMI) (weight in kilograms divided by the height in meters squared) to be calculated, along with the age and gender of the individuals. The number of activities listed as part of their on-going physical activity program, number of activities that occurred outdoors, the number of on-going environmental sustainability actions, and self-report health status are additional independent variables. The dependent variable of this particular study was the happiness scores that were obtained from the OHQ.

Statistical Analysis

A statistical analysis was performed on the data from the OHQ to determine if there was a difference in the happiness levels of the Mountain Challenge students compared to the other Maryville College students. The descriptive statistics were used to calculate the average happiness levels of both groups, and independent samples T-tests were used to determine whether there were significant differences in happiness between the groups. A p-value of <0.05 was used to determine significant differences. In addition to comparing the happiness scores of both the control group and the experimental group, the gender, BMI (using the height and weight), self-reported physical activity levels, amount of outdoor physical activity, number of environmental actions, time spent sitting, and self-reported health status of the individuals were examined using independent samples T-tests for continuous variables, and Chi Square tests were used for categorical

variables to determine if those variables were different between the groups and whether they had any influence on the happiness levels of those who participated in the experiment. We also graphically presented the percentage of total participants engaging in sustainable actions, a comparison of the percentage of sustainable actions of Mountain Challenge Students and Non-Mountain Challenge Students, the percentages of total participants engaging in different types of physical activity, and the percentages of Mountain Challenge students and Non-Mountain Challenge students engaging in different types of physical activity.

CHAPTER IV

RESULTS

Our descriptive statistics showed characteristics of our total sample (n=24) and presents the comparison between Mountain Challenge students (n=15) and Non-Mountain Challenge students (n=9) (Table 1). Overall the students were on average 19.88 years of age and had a body mass index (BMI) that was in the normal weight category (24.49 ± 3.46). The average height of the students was 1.70 ± 0.12 meters, and their average weight was 71.56 ± 16.00 kilograms. On a 6-point scale, all participants reported high levels of happiness (4.74 ± 0.43). The number of sustainable actions performed by each student was (3.17 ± 5.15). The students reported engaging in an average of (812.63 ± 386.40) minutes of moderate to vigorous physical activity, with 70.94% of all physical activities performed being outdoors activities.

Table 1. Characteristics of study population in total (n = 24) and separated by groups.

	TOTAL	MOUNTAIN CHALLENGE	NON-MOUNTAIN CHALLENGE	p-value
Number (n)	24	15	9	
Age (years)	19.88 (1.26)	19.73 (1.44)	20.11 (0.93)	0.49
Height (m)	1.70 (0.12)	1.69 (0.12)	1.72 (0.13)	0.56
Weight (kg)	71.55 (16.00)	70.64 (16.95)	73.08 (15.13)	0.73
BMI (kg/m ²)	24.50 (3.46)	24.52 (3.94)	24.45 (2.71)	0.96
Happiness Score	4.74 (0.43)	4.75 (0.34)	4.72 (0.57)	0.87
Sustainable Actions (#)	3.17 (5.15)	4.60 (6.08)	0.78 (1.09)	0.08
Outdoor Activities (%)	70.94 (30.36)	84.04 (40.08)	50.00 (25.00)	0.03
Weekly MVPA (min)	812.63 (386.40)	913.67 (369.05)	644.22 (373.99)	0.10

BMI: body mass index, MVPA: moderate-to-vigorous physical activity

There were no significant differences between the Mountain Challenge students and Non-Mountain Challenge students in age, height, weight, BMI, happiness score or self-reported minutes in moderate to vigorous physical activity in the past seven days. The percentage of physical activity performed outdoors showed a significant difference (p=0.032) between Mountain Challenge students and Non-Mountain Challenge students. Specifically, the Mountain Challenge students engaged in a significantly higher percentage of outdoors activities (84.08±40.08) than Non-Mountain Challenge students (50.00±25.00). The difference in the number of sustainable actions performed by the students trended towards significance (p=0.078), with Mountain Challenge students engaging in an average of 4.60±6.08 activities compared to 0.78±1.09 activities in the Non-Mountain Challenge students.

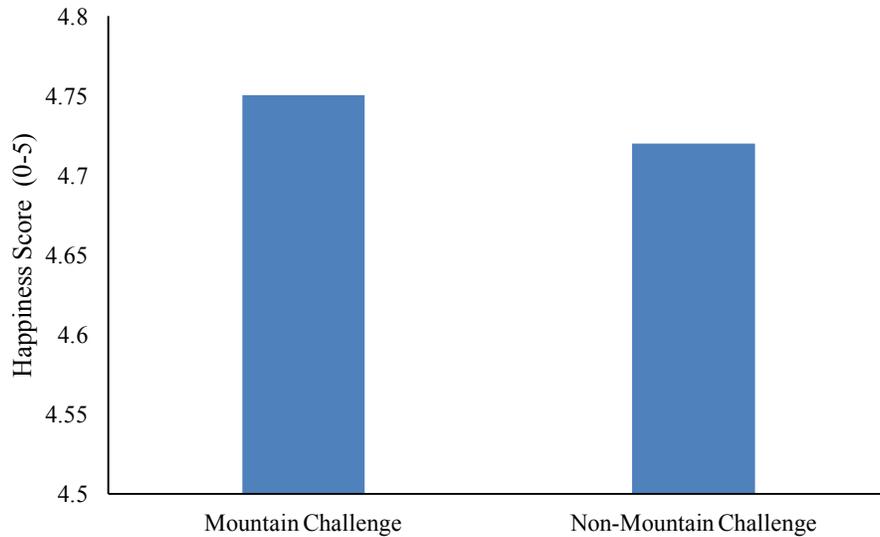


Figure 1. Happiness Scores of Mountain Challenge students and Non-Mountain Challenge students. Happiness was ranked on a 6-point scale.

The sustainable actions taken by the overall group consisted of a wide variety of activities. Recycling and power control were the two most commonly cited sustainable actions. A vast majority of the individuals (75%) participated in recycling materials including aluminum, plastics, cardboard, bottles, metals, paper, and glass. In addition, many of the participants (41.7%) mentioned power control as one of the ways of being sustainable. A number of the participants (16.7%) mentioned reducing their carbon footprint by either carpooling or walking/biking whenever possible. Avoiding plastics or using reusable materials (a refillable water bottle and/or grocery bags) was also a means of being sustainable (16.7%). Some participants (12.5%) said they picked up trash whenever they saw it. Other participants (8.3%) engaged in buying local or organic materials/foods. Refashioning clothing, buying/donating used goods (tents, hiking gear, etc.) was also mentioned as a way of being sustainable (8.3%). One participant (4.2%) included donating to organizations supporting sustainable or environmental protections as a final means of being sustainable (Figure 2).

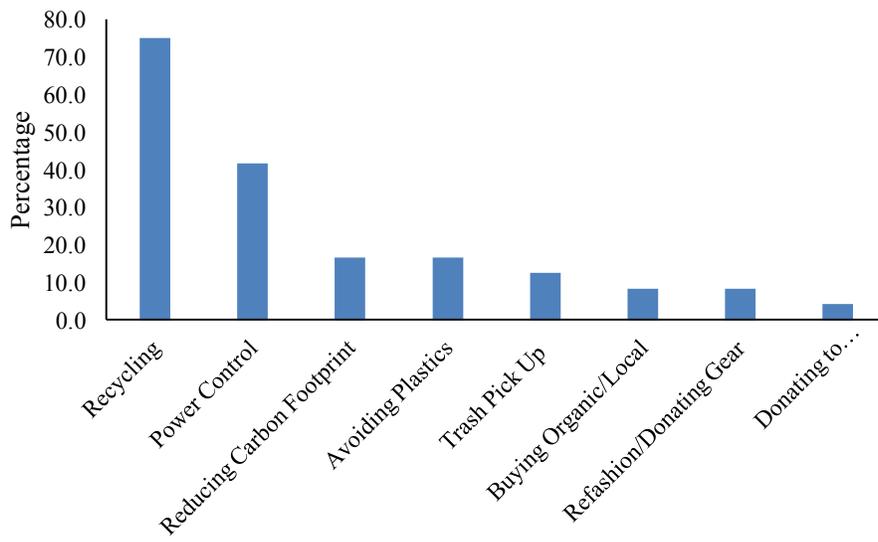


Figure 2. Percentage of total participants engaging in sustainable actions. Donating to...: donating to organizations supporting sustainable or environmental protections such as the National Parks Services or Save Our Parks Foundation.

Recycling was the action taken by most participants in the study, with 86.7% of Mountain Challenge students and 55.6% of Non-Mountain Challenge students engaging in recycling. Power control was engaged in by both groups with 53.3% of Mountain Challenge students and 22.2% of Non-Mountain Challenge students mentioning it as a way of being sustainable. Reducing the carbon footprint was taken by 20.0% of Mountain Challenge students and 11.1% of Non-Mountain Challenge students. Avoiding plastics (26.7%), trash pick-up (13.3%), buying organic/local (13.3%), refashioning clothing/donating gear (13.3%), and donating to organizations that support the environment (6.7%) were mentioned only by Mountain Challenge students.

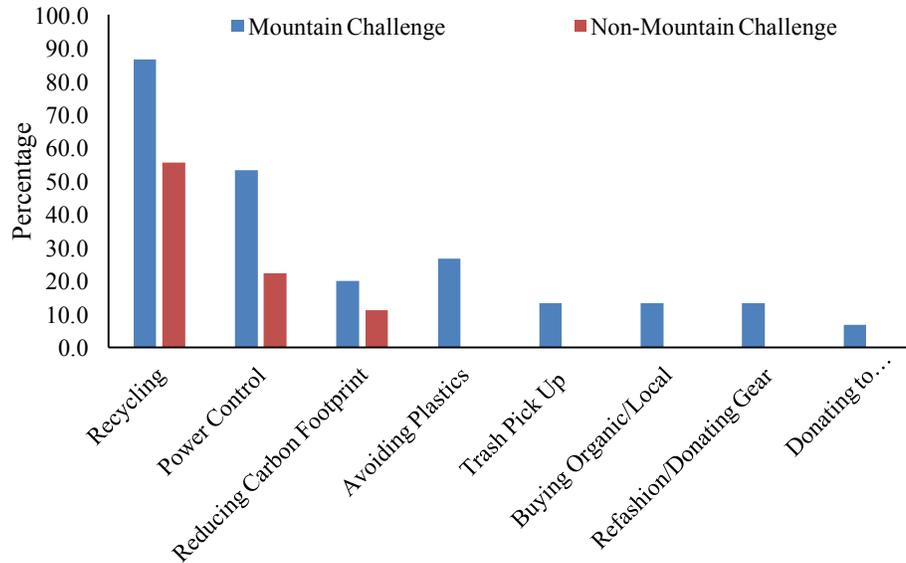


Figure 3. Comparison of the percentage of sustainable actions of Mountain Challenge students to Non-Mountain Challenge students. Donating to...: donating to organizations supporting sustainable or environmental protections such as the National Parks Services or the Save Our Mountains Foundation.

The participants also self-reported all of the physical activities they performed within the last 7-day period. Overall, strength training was the top means of being active (44%). The other most popular activities performed were hiking (40%), running (40%), and rock climbing (28%). Participants also reported the following activities: walking (20%), biking (16%), soccer (12%), volleyball (8%), yoga (4%), swimming (4%), and hunting (4%).

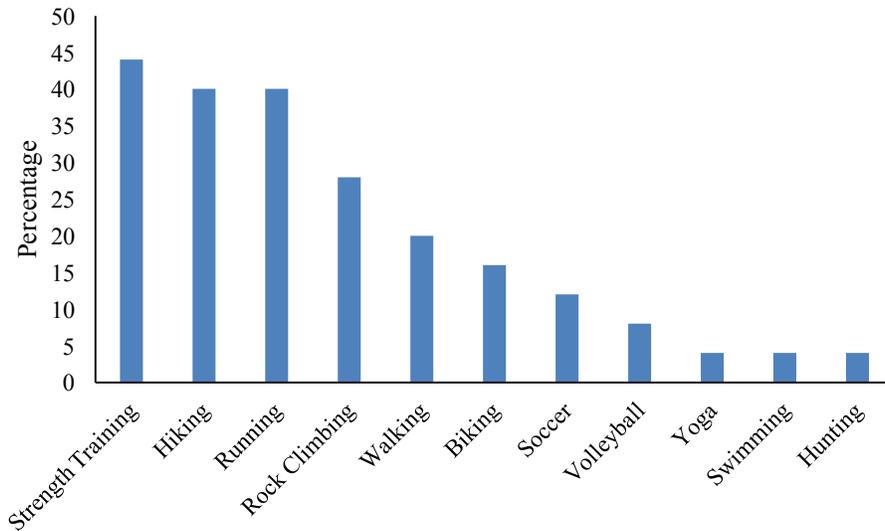


Figure 4. Percentages of total participants engaging in different types of physical activity.

Of the two groups, 66.7% of Non-Mountain Challenge students engaged in strength training, while only 33.3% of Mountain Challenge students did so. Hiking was much more prevalent for the Mountain Challenge students with 53.3% of participants mentioning it, while only 22.2% of Non-Mountain Challenge students hiked. Running was another common feat of the Non-Mountain Challenge students with 55.6% of those participants running, while only 33.3% of the Mountain Challenge students ran. Rock climbing and biking were two activities mentioned by only Mountain Challenge students with the percentages being 46.7% and 26.7%, respectively. Walking was another activity dominated by the Non-Mountain Challenge students with 44.4% of them walking compared to only 6.7% of the Mountain Challenge students. Soccer and volleyball both showed the same percentage of Mountain Challenge students at 6.7%, while the percentage of Non-Mountain Challenge students who played soccer was higher (22.2%) than the percentage who played volleyball (1.1%). Yoga, swimming, and hunting were

only performed by Non-Mountain Challenge students and all were performed by 11.1% of the group.

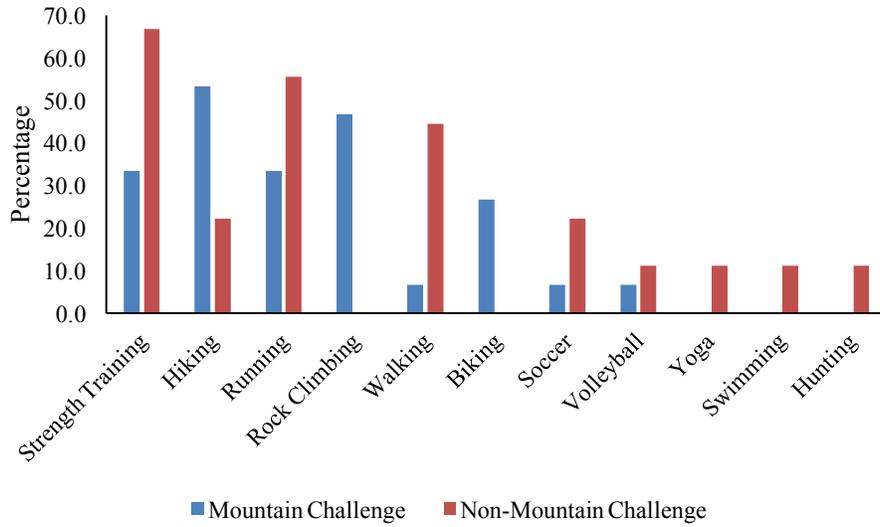


Figure 5. Percentages of Mountain Challenge students and Non-Mountain Challenge students engaging in different types of physical activity.

CHAPTER V

DISCUSSION

There were numerous areas examined with this study, including descriptive statistics, happiness, sustainable actions, and types of physical activity performed by two groups: Mountain Challenge students and Non-Mountain Challenge students. Overall, there was only a significant difference found between one of the characteristics mentioned, while a few others leaned towards being significantly different. The two groups were quite comparable in every variable, other than the percentage of activities performed outdoors, where we saw that the Mountain Challenge students reported performing a significant greater percentage of their total physical activities outdoors compared to Non-Mountain Challenge students. Based on current literature, we had hypothesized that the happiness levels of Maryville College Mountain Challenge students would be greater than students who are not involved with Mountain Challenge, and this would be related to Mountain Challenge students spending more time outdoors and that practice having a positive impact on a person's happiness levels.

While the results from the study do not necessarily line up with the hypothesis of the study, interesting results were found in other areas. The happiness levels of the Mountain Challenge students were expected to be higher when compared to the Non-Mountain Challenge students, but the values of the two were not found to be significantly

different. In a study done by Nisbet et al., it was found that college aged students typically have an overall high satisfaction with life (Nisbet et al., 2011). In a study conducted by Alemdag, Alemdag, and Ozkara found university students have moderate levels of happiness when compared to other groups. Students who were the most active were the happiest of the participants and those who were less active or not active at all had lower levels of happiness. They reported physical activity is a contributing factor for subjective happiness levels (2016). Another study conducted by Stone et al. showed a connection between age and well-being. The study was done on individuals aging between 18 and 85. The age group of 18-21 showed the highest levels of well-being and happiness for both females and males. Through the course of life, that happiness decreased until the ages of 50-53 for both genders, when it began to increase again (Stone, Schwartz, Broderick, & Deaton, 2010). These ideas lead us to believe our results could have varied had the participant age varied greater than 18 to 23 years of age.

When comparing the percentage of activities performed outdoors to total physical activities performed, it was found that Mountain Challenge students engaged in over 84 percent of their activities outdoors while the Non-Mountain Challenge students performed only 50 percent of their activities outdoors, which was statistically significant. In a study conducted by Calogiuri et al., researchers found a higher positive emotional response when exercise was completed outside compared to the same activity being completed inside. Participants also reported enjoying the activity much more when outside. The individuals in the study had higher motivation to exercise and also wanted to exercise more frequently when it was done outdoors (Calogiuri et al., 2015). Research has shown performing activities outside gets people out in nature much more and has a

positive correlation to nature connectedness and to being happier, more content, and having a higher satisfaction with life. In a study conducted by Veloso and Loureiro, activities performed outside were found to have a high correlation in participants having a desire to perform the activity repeatedly, which could lead to individuals performing activities more regularly than those who exercise indoors. The individuals who participated in the outdoor exercise had higher psychological and physiological responses to exercise than those who exercised inside (Veloso & Loureiro, 2014). However with our study, while the Mountain Challenge students were spending a much higher percentage of their time outdoors, there was not a significant difference between the weekly minute of moderate to vigorous physical activity when compared to the Non-Mountain Challenge students. This phenomenon is interesting and contradicts much of the literature on performing activities outside and how this typically results in more total physical activities performed. It is interesting that this occurred; however, it is also important to understand the background of outdoor activities that Mountain Challenge students participate in. Mountain Challenge students perform every activity of their job outdoors, whether it be leading students on hikes, taking students rock climbing or caving, being a lead on a white water rafting trip, doing yoga on the Rocky Park Farm with students, taking students to the river to paddle or kayak, belaying students on the Alpine Tower located in the yard of Crawford House, or leading groups on the low or high ropes course in the Maryville College Woods. Keeping this in mind helps understand why the Mountain Challenge students are more inclined to obtain their physical activities outside as opposed to performing their moderate to vigorous physical activity indoors.

In terms of the physical activities individuals participated in, there was a wide array of activities. These included strength training, hiking, running, rock climbing, walking, biking, soccer, volleyball, yoga, swimming and hunting. Of these activities, it was interesting to examine which populations participated in which activities. Strength training, which is an indoor activity, was mentioned by 66.7% of Non-Mountain Challenge students and only 33.3% of Mountain Challenge students. The outdoor activities were dominated by the Mountain Challenge students, which included hiking, rock climbing, and biking. These activities are all performed regularly by the Mountain Challenge program, and often times Crawford House puts on open trips where any student can go on trips with the Mountain Challenge staff. Open hikes and rock climbing trips are available almost every weekend, and a rock climbing class is even part of the outdoor recreation program on campus. This class educates individuals of the proper techniques of outdoor rock climbing, so it is apparent why Mountain Challenge students engaged in this activity while the Non-Mountain Challenge students did not. It is thought that the Non-Mountain Challenge students are not presented with the same outdoor activity experiences as the Mountain Challenge students, so the Mountain Challenge students are more aware of being outdoors and doing outdoor activities. Being physically active, regardless of whether it is performed indoors or outdoors, has been shown to increase the happiness levels of individuals. A study conducted by Mohammadi, Matvandi, and Saberi examined the relationship of physical activity and happiness (2015). The researchers looked at happiness levels and how they are influenced by different levels of engaging in physical activities. The students who engaged in high amounts of physical activity were found to be happier than those who participated in little

physical activity and much happier than those who did not participate in any physical activity whatsoever. The happiness of the physically active is due to the endorphins released. Fatigue is decreased while vitality and happiness are increased with exercise (Mohammadi, Batvandi, & Saberi, 2015).

In the area of sustainable actions, while there was no significant difference in activities engaged in by Mountain Challenge students compared to Non-Mountain Challenge students, Mountain Challenge students appeared to engage in higher amounts and a wider variety of sustainable actions. These sustainable actions included recycling, power control, reducing the carbon footprint, avoiding plastics, picking up trash, buying organic or local, refashioning old gear or donating the old gear to others or donation centers, or donating to establishments that support the environment, such as the National Park Service or the Save Our Mountain Foundation. Being sustainable is important for the environment for numerous reasons. Throughout history, it is clear to see the impact humans have had on the environment and how degrading those actions have been for the future. People who live in urban communities consume much more energy than those who live in rural areas, even though there are more rural areas around the world than urban areas. Estimations have been made that humans use over 40 percent more unrenewable resources per year than can be put back into the earth. Sustainability, while it focuses on the environment, is also about how people can damage the earth and create damage to others around the world because of their actions (Lorek & Fuchs, 2011). For these reasons, and many more, it is important for the Mountain Challenge students to be engaged in sustainable actions, along with those who are not involved with Mountain Challenge. Mountain Challenge students work for a company, the Crawford House, in

which the average monthly electricity bill is 75 cents and where they are a certified zero-waste facility. They also have a B Corporation Certification, which simply means their mission is based strictly on the environment. Sustainability is something that is greatly promoted by Bruce Guillaume and his staff, so the employees of Mountain Challenge and the Crawford House are greatly educated on sustainable actions and their importance (Guillaume, n.d.). In a study conducted by Nisbet et al., researchers found that those students who were taking environmental classes, as Mountain Challenge students do, were more passionate about nature and cared about protecting it more when compared to those who were not taking environmental courses. When educated on the damaging effects of human actions on the environment, individuals tend to be more aware of their actions and take more actions to lessen their detrimental impact on the earth and environment (E. K. Nisbet et al., 2011).

When talking about the sustainable actions taken by groups, recycling was mentioned by 75 percent of the participants. This high number of engagement can be supported by the high encouragement of the Maryville College facilities in being environmentally friendly or “green” in the idea of the Maryville College Initiative Fit. Green. Happy.TM The College strongly promotes being green and actively engages students in green actions, such as measuring the amount of food waste in the dining halls and making students aware of these measurements, having double the recycling bins around campus compared to trash cans, and having freshman year seminar classes on environmentally friendly topics. In addition, nearly 42 percent of individuals mentioned power control. This can also be attributed to the Maryville College environment. Above almost every light switch around campus is a sign reading: “Turn me off when you leave

the room.” This encourages individuals to not use unnecessary amounts of electricity for when rooms are empty.

Limitations

With any study, there are limitations to doing research. While this study provided some interesting results, they could have varied depending on the sample size of the study. The sample size was only 24, with 15 of those participants being in the experimental group of Mountain Challenge students and 9 of the participants being in the control group of Non-Mountain Challenge students. The participants of the Mountain Challenge students group were recruited by their program, while the Non-Mountain Challenge students group was recruited by researchers, which could have also influenced the results. The study was also performed on all college students (ages 18 to 24), which could also be another reason for similar results between the two groups. Generally, people of those ages tend to be happy and content with life. The study was conducted between late October and early November. This is a time of relative calmness in classes around the Maryville College campus: mid-term papers and exams have been completed in every class, and final examinations, papers, and presentations are nearly a month from being taken. This could be another reason for the high happiness scores. Being outdoors or being physically active outdoors may have had little effect on students’ stress levels if there are not many stresses being presented at that time of year. If the study was conducted in a different time of the semester, the results could have varied significantly. The study was also reliant fully on self-report instruments for the happiness scores, the Oxford Happiness Questionnaire, so the results could have varied slightly if different

validated measures would have been used, such as the New Ecological Paradigm Scale, the New Ecological Conscious Scale, or the Ecology Scale to capture the happiness levels.

When using self-report measures as a means of gathering data, it is important to investigate social desirability. It is possible that participants will provide data that is incorrect or skewed so they do not prove to be an outlier to the researchers or so they provide the data that they think the researchers are trying to find. However in a study conducted by Miller, it was found that undergraduate students are less likely to contribute to the social desirability effect. The study did not find great influence of the social desirability factor on the four different surveys they conducted (Miller, 2012). In our case, our results could be more influenced by the studies of Alemdag, Alemdag, & Ozkara (2016) and Stone, Schwartz, Broderick, & Deaton (2010) that say that undergraduate students are overall just happier than older individuals.

Conclusion

In conclusion, this study showed that Maryville College students are generally happy, engage in sustainable activities, and routinely participate in physical activity, both inside and outside. Overall, the study compiled a few good statistics to be further researched upon. Moving forward, this study provides a good base for examining indoor and outdoor activities and the differences between individuals who engage in either one or the other. There is also more research to be conducted on environmental behaviors and their association with knowing more about the environment and how human activity impacts the environment, either negatively or positively. The study provided a good base

for examining numerous characteristics of nature and its impact on the health and well-being of individuals who are outdoors in nature regularly compared to those who do not spend as much time outdoors in nature. There are four topics from this study that could potentially be investigated individually on a larger scale with more participants in future research: comparing the sustainable actions, outdoor activities, and happiness of people who spend adequate time outdoors to those who spend much less time outdoors.

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